

CLAIMS AMENDMENTS

1 - 12. (CANCELED)

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13. (CURRENTLY AMENDED): A computer program product comprising executable code for a method of matching a first data set and a second data set where the first data set and the second data set include an operating characteristic for a process, the method comprising the steps of:

10 i. fingerprinting the first data set and the second data set;
 ii. finding correspondences between transition points in the first data set and the second data set; and
 iii. comparing the first data set and second data set using the correspondences from step ii to determine whether the first data set and the second data set

15 match,

wherein step i comprises:

A. detecting transition points in the first data set and the second data set so as to define data intervals wherein each data interval comprises the data between successive transition points;

20 B. computing a best fit of the data in each of the data intervals using basis functions; and

C. computing fitting errors between the data in the data intervals and the best fit and determining if the errors are less than a predetermined threshold and recursively finding additional transition points as necessary to produce fitting errors less than the threshold.

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14. (ORIGINAL): The method of claim 13 further comprising displaying the comparison results from step iii.

30 15. (ORIGINAL): The method of claim 13 further comprising generating an alarm if the first data set and second data set do not match.

16. (ORIGINAL): The method of claim 13 wherein the first data set and second data set include the operating characteristic being a function of time; the method further comprising time-stretching at least one portion of the first data set and of the second data set by inserting interpolated values so as to produce an equal number of data points in each portion of the data sets, so that the first data set and the second data set have substantially the same time reference for step iii.

5 17. (CANCELED)

10 18. (ORIGINAL): The method of claim 13 wherein the process comprises an electronic device fabrication process and the first data set comprises temperatures of a semiconductor wafer as a function of time and the second data set comprises temperatures of a semiconductor wafer as a function of time.

15 19. (ORIGINAL): The method of claim 13 wherein the process comprises an electronic device fabrication process.

20 20. (CURRENTLY AMENDED): A method of matching a first data set and a second data set where the first data set and the second data set include temperature measurements as a function of time for a process performed on a semiconductor wafer in a process tool, the method comprising the steps of:

- i. fingerprinting the first data set and the second data set using the steps of
 - A. detecting transition points in the first data set and the second data set so as to define data intervals wherein each interval each data interval comprises temperature data between successive transition points;
 - B. computing a best fit of the temperature data in each of the data intervals using basis functions; and
 - C. computing fitting errors between the temperature data in the data intervals and the best fit and determining if the errors are less than a predetermined threshold and recursively finding additional transition points as necessary to produce fitting errors less than the threshold;

- ii. finding correspondences between transition points in the first data set and the second data set; and
- iii. comparing the first data set and second data set using the correspondences from step ii to determine whether the first data set and the second data set match.

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21. (NEW): The method of claim 20 further comprising time-stretching at least one portion of the first data set and of the second data set by inserting interpolated values so as to produce an equal number of data points in each portion of the data sets, so that the first data set and the second data set have substantially the same time reference for step iii.

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22. (NEW): A computer readable medium containing executable steps for a method of matching a first data set and a second data set where the first data set and the second data set include data measurements for monitoring processes for processing workpieces, the method comprising the steps of:

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- i. fingerprinting the first data set and the second data set;
- ii. finding correspondences between transition points in the first data set and the second data set; and
- iii. comparing the first data set and second data set using the correspondences from step ii to determine whether the first data set and the second data set match,

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wherein step i comprises:

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- A. detecting transition points in the first data set and the second data set so as to define data intervals wherein each data interval comprises the data between successive transition points;
- B. computing a best fit of the data in each of the data intervals using basis functions; and
- C. computing fitting errors between the data in the data intervals and the best fit and determining if the errors are less than a predetermined threshold and recursively finding additional transition points as necessary to produce fitting errors less than the threshold.

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23. (NEW): The computer readable medium of claim 22 wherein the data measurements include temperature measurements.

5 24. (NEW): The computer readable medium of claim 22 wherein the process comprises an electronic device fabrication process and the first data set comprises temperatures as a function of time and the second data set comprises temperatures as a function of time.

10 25. (NEW): The computer readable medium of claim 22 wherein the data measurements include measurements of resistivity, dielectric constant, ion flux, deposition rate, or etch rate

15 26. (NEW): The computer readable medium of claim 22 wherein the first data set and the second data set include data measurements for electronic device fabrication

20 27. (NEW): The computer readable medium of claim 22 wherein the first data set and the second data set include data measurements for flat panel display processing or lithography mask processing

25 28. (NEW): The computer readable medium of claim 22 wherein the first data set and second data set include data measurements as a function of time; the method further comprising time-stretching a portion of the first data set or a portion of the second data set by inserting interpolated values so as to produce an equal number of data points in each portion of the data sets, so that the first data set and the second data set have substantially the same time reference for step iii.

30 29. (NEW): The computer readable medium of claim 22 wherein the workpiece comprises a semiconductor wafer and the process is selected from the group consisting of post-exposure bake, plasma etching, plasma deposition, plasma enhanced chemical vapor deposition, chemical vapor deposition, and sputter deposition.

30. (NEW): The computer readable medium of claim 22 wherein the workpiece comprises a semiconductor wafer for fabricating electronic devices and the data measurements are data measurements for fabricating electronic devices.

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31. (NEW): The computer readable medium of claim 22 wherein the workpiece comprises a semiconductor wafer and the data measurements are selected from the group consisting of etch rate, plasma potential, and RF power.

10 32. (NEW): The computer readable medium of claim 22 wherein step A comprises numerically differentiating the data measurements and searching for points at which the second derivative exceeds a predetermined threshold.

15 33. (NEW): The computer readable medium of claim 22 wherein step B comprises fitting the data intervals using a set of basis functions that include at least one of linear functions, exponentials, double exponentials, and sinusoids, polynomials, and other standard basis functions.